

11 a controller for receiving a signal from said temperature sensing device, said  
12 controller switching said fan on or off in response to said signal.

REMARKS

Applicant respectfully requests reconsideration of this application as amended. Claims 1-24 are pending in the application. Claims 1-11 have been canceled without prejudice. Claims 16-20, 23 and 24 have been amended. No new claims have been added.

Applicant has amended the claims and specification, particularly to overcome the Examiner's rejections under 35 U.S.C. §112, Examiner's objections to the drawings, and to correct informalities discovered during review of the application. Applicant respectfully requests the Examiner to enter the amendments.

Claims 1-11 were rejected under 35 U.S.C. §102(b) and §103. Applicant has cancelled claims 1-11 without prejudice. Therefore, the rejections of these claims are obviated.

Claims 12, 14, 15 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Penniman et al., U.S. Patent No. 5,568,360 in view of Ohashi et al., U.S. Patent No. 5,694,294. Penniman et al. discloses a portable computer having a keyboard with a thermally conductive support plate (28), a heat pipe (34) and CPU (42). The heat pipe is "a thermally conductive metallic vessel" and is either "a single elongated member or the more preferred orthogonally arranged, contiguous dual members." Col. 5, lines 36-37 and Col. 6, lines 40-41.

Ohashi discloses a portable computer having a fan (4). The keyboard 36 and an electronic circuit board 3 create a gap representing a first space 5. Col. 3, lines 4-6. Circuit boards 2 and 3 create a second space 6 wherein "high-exothermic devices are mounted . . . [facing] . . . each other across the second space 6." Col. 3, lines 6-8 and 20-22. The fan 4 is mounted where part of board 3 is cut away so that the suction side faces

the first space and the exhaust side faces the second space. Col. 3, lines 23-26. Outside air 24 flows into the first space to cool the back of the keyboard 36 by circulating around the first space. Col. 4, lines 3-9. Air flowing out of fan 4 enters the second space to cool the devices facing each other. Col. 4, lines 9-11. A skirt-like member 45 is provided when there is enough room to allow “a pressure drop at the fan exhaust port to be decreased and the air flow amount of the fan 4 to be increased.” Col. 5, lines 44-57.

It would not have been obvious to combine the fan of Ohashi with the portable computer of Penniman because the structure the fan is used to cool does not exist in the computer of Penniman. Thus, it would not have been obvious to one of ordinary skill in the art to use Ohashi’s fan in Penniman’s computer. Penniman’s keyboard has a thermally conductive support plate and a flat heat pipe for removing heat from CPU 42. Penniman specifically teaches away from the use of fans because “an operable fan would unduly draw upon the batteries of a laptop making it unattractive for long periods of battery-operated use” and the thermal management system of Penniman is “operably superior to conventional fans.” Col. 2, lines 8-13.

Further, even if the Ohashi and Penniman were combined, the combination would not result in the inventions claimed in claims 12 and 20. Claim 12 recites “at least a portion of said housing being thermally coupled to said flat heat pipe.” Claim 20 recites “a thermally conductive fin located within said air flow, said heat pipe thermally coupled to said fin.” Neither Ohashi nor Penniman teach or suggest a heat pipe being thermally coupled to either a housing or a fin. Penniman discloses a flat heat pipe, but does not disclose any air moving means. Ohashi discloses a fan, but does not disclose a housing that is thermally coupled to a flat heat pipe, since Ohashi does not disclose a flat heat pipe. Ohashi does not disclose a fan housing being thermally coupled to anything. Ohashi also does not disclose a fin thermally coupled to a flat heat pipe.

In the invention of claim 12, air flow generated by an air moving means may impinge a portion of the housing that is thermally coupled to the flat heat pipe to aid in

cooling the portable computer. In the invention of claim 20, a portion of the heat generated by the heat generating device is dissipated through the flat heat pipe to the fin, then the air flow causes the heated air to be exhausted to the ambient. This is a novel idea not taught by the prior art. Therefore, Applicant respectfully submits that claim 12, its dependent claims 14 and 15, and claim 20, are allowable over the combination of Penniman and Ohashi.

Claim 13 was rejected under 35 U.S.C. §103(a) as being unpatentable over Penniman et al. in view of Ohashi et al. as applied to claim 12 and further in view of Carlsten et al., U.S. Patent No. 5,283,715. Penniman and Ohashi disclose portable computers as discussed above. Carlsten discloses a heat pipe structure that is incorporated directly into the metal baseplate of a circuit card. Abstract. Carlsten does not teach or suggest using a fan with the heat pipe structure. Thus, Carlsten does not overcome the deficiencies of the combination of Penniman and Ohashi. Therefore, Applicant respectfully submits that claim 13 is allowable over Penniman, Ohashi and Carlsten.

Claims 16-19 and 21-24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Penniman et al. in view of Ohashi et al. as applied to claims 12 and 20, and further in view of Dinh et al., U.S. Patent No. 5,526,289. Dinh discloses a personal computer having a fan wherein the speed of the fan changes proportionally to the change in temperature inside the computer housing. Col. 1, line 66-col. 2, line 3. When the temperature inside the computer becomes very high, protection circuitry sends a signal to the power supply 60 to shut off. Col. 3, lines 62-65. Dinh does not teach using the fan with a heat pipe structure. Thus, Dinh does not overcome the deficiencies of Penniman and Ohashi.

Further, the combination of Penniman, Ohashi and Dinh would not meet the additional features of the inventions of claims 16-19 or 21-24. Dinh does not teach “switching said fan on or off in response to a temperature measurement” as recited in claims 16 and 17 or “switching said fan on or off in response to said signal” as recited in claims 18, 19 and 21-24. Dinh shuts the whole computer off in response to overheating.

The features recited in claims 16-19 and 21-24 allows the fan to be energized when additional heat removal capacity is required, thus conserving battery power. This is not taught by the prior art. Therefore, Applicant respectfully submits that claims 16-19 and 21-24 are allowable over Penniman, Ohashi and Dinh.

Accordingly, Applicant respectfully submits that the rejections under 35 U.S.C. "112 and 103 have been overcome by the amendments and remarks, and withdrawal of these rejections is respectfully requested. Applicant submits that claims 12-24 are in condition for allowance and such action is earnestly solicited.

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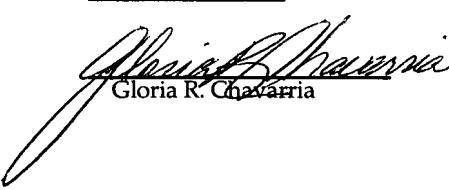
Respectfully submitted,  
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February 10, 1999  
Date